

# United States Patent [19]

Jimbo

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## [54] APPARATUS FOR MEASURING PARTICLE-SIZE DISTRIBUTION

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[53] Field of Search 73/865.5, 438, 714, 73/438

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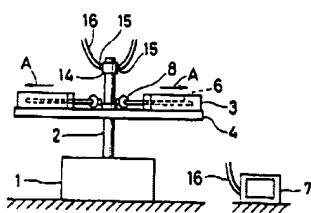
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### [57] ABSTRACT

An apparatus for measuring particle-size distribution which is constructed by arranging a measuring cell or cells in vertical direction, i.e. their longitudinal directions in alignment with the direction of the gravity, or mounting a measuring cell or cells on a rotor rotatable in a horizontal plane so that their longitudinal directions are in alignment with the radial directions as that of centrifugal force; inserting tips of a couple of pressure transmitting tubes having lengths different between them into each of said measuring cells; and securing base ends of said pressure transmitting tubes to a pressure-detecting unit. To operate this apparatus, a suspension of a powder to be measured is introduced into said measuring cell, particles of suspension in the measuring cell is made to settle by the gravity or a centrifugal force, the amount of powder between the tips of pressure transmitting tubes of said couple is determined by measuring the pressure difference between said tips, and the particle-size distribution is determined on the basis of the obtained amount of powder and a particle size calculated by Stokes' law from the settling time elapsed.

8 Claims, 4 Drawing Sheets



### DEPR:

FIG. 6 illustrates ratios of error in measuring particle-size distribution in the case when the measurements are conducted at the inserted depths of h.sub.2, h.sub.3 and h.sub.4 with a sample of 1-10 .mu.m in particle size. As can be seen from this figure, the influence of inserted length is weak on the part of finer particles, but the inserted length greatly affects errors in measuring the part of coarser particles. The ratio of errors in measuring in the coarse particle range is smaller when the inserted length is greater.

### DEPR:

FIG. 7 shows a particle-size distribution curve for a representative powder, depicted (in percent) as the ratio of particles remaining in the sieve versus sieve mesh or opening diameter expressed in .mu.m. This curve is divided into three segments to illustrate the portion of particle-size distribution that would be measured by each of three pairs of pressure transmitting tubes inserted at depths h1, h2 and h3 in cells containing identical samples of the powder.

### DEPR:

In addition, when these procedures are adopted, the calculation of a mean value which is usually conducted after measuring multiple samples successively can easily be performed. Further, when different samples are introduced in the respective measuring cells, data and the mean value as well as individual data of different samples can be obtained by only one measuring operation.

### CLPR:

1. An apparatus for measuring particle-size distribution of a powder which comprises: a measuring cell for receiving a suspension of particles to be measured, a rotor on which said measuring cell is mounted in a radial direction, a driving unit for rotating said rotor about an axis of rotation, a pair of parallel pressure transmitting tubes extending in a radial direction into said cell, each of said tubes having opposite tip and base ends, said tip ends of said pressure transmitting tubes inserted from the general direction said axis into said measuring cell with said tip ends at individually different distances from said axis, and a pressure-detecting unit to which said base ends of said pressure transmitting tubes are secured, said pressure detecting unit having a pressure sensitive membrane between said base ends of said tubes for sensing the pressure difference between said base ends of said tubes being adjacent said axis of rotation of said rotor and lying in a plane extending radially thereof, said pressure-detecting unit being electrically connected with a measuring device.

### CLPR:

5. An apparatus for measuring particle-size distribution of a powder which

Details Text Image KWIC

	U	1	Document ID	Issue Date	Page	Current OR	Current XRef	
1			US 6171743 B1	20010109	9	430/110.3	430/110.4	Electrostat
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